Running head: Determining Preventable Causes for Traumatic EMS Calls in the Older Citizens of Corvallis, Oregon

Determining Preventable Causes for Traumatic EMS Calls in the Older Citizens of Corvallis, Oregon

Chris E. Hunt

Corvallis Fire Department, Corvallis, Oregon

Certification Statement

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

Signed: _____

Abstract

Older Americans are being treated in emergency rooms for injuries at an alarming rate. Many of those injuries are thought to be preventable. The problem is that the Corvallis Fire Department (CFD) has not determined if there are preventable causes for the traumatic EMS calls from the older citizens of the community, leaving them vulnerable to injury and death. The purpose of this paper is to identify the preventable causes of traumatic EMS calls related to its' citizens who are 65 years of age and older.

A descriptive method of research was used to answer these questions: 1) What are the primary types of traumatic calls to the older citizens in Corvallis, 2) What are the preventable causes for the traumatic calls to the older citizens of Corvallis, 3) What programs are available nationally for these preventable causes, and 4) What partnerships could CFD form to deliver and provide prevention training and information to the older citizens of Corvallis?

Local data from the CFD Records Management System (RMS) revealed that falls are by far the number one cause of injuries to the older citizens of Corvallis. An attempt to determine the root cause found women are more likely than men to fall, and that most injuries are a result from falling from a height above ground level. In addition, two trends were identified as potential contributing factors to those falls – previous medical history and the use of multiple medications.

Recommendations include a focus on preventing falls in the female population as well as education regarding falls from above ground. More focused research is needed to determine the root causes of these fall injuries as well as capturing data on falls that are not reported or do not cause injury.

Table of Contents

Tables and Figures

Appendices

Determining Preventable Causes for Traumatic EMS Calls in the Older Citizens of Corvallis, Oregon

Across the United States hundreds of thousands of older Americans are being treated in medical facilities each year for various traumatic injuries (Johnson, Thomas, Thomas, & Sarmiento, 2009). In the year 2000 alone there were 50 million injuries in all age groups "costing an estimated $406 billion in medical expenses and productivity losses" (Johnson, Thomas, Thomas, & Sarmiento, 2009, p. 1). They go on to say that the injury and hospitalization rate per capita of the 65 and over age group is anywhere from two to ten times higher than that of any other age group.

Vincent and Velkoff (2010) estimate the 65 and over age group are expected to double from 40.2 million to 88.5 million by the year 2050. Although the entire population is also expected to continue to increase over this period, the 65 and over group is projected to increase its total percentage of the population from roughly 13 percent to 19 percent. This is a result of the transition of the baby boomer population into the 65 and over age group. Until an emphasis is placed on the prevention of injuries in this age group, the impact to communities across the United States will also continue to grow. This increase is clearly not a sustainable trend for emergency services. Each Community will need to determine the causes of injuries in their own area to determine the best methods of prevention.

The problem is that the Corvallis Fire Department (CFD) has not determined if there are preventable causes for the traumatic EMS calls from the older citizens of the community, leaving them vulnerable to injury and death. The purpose of this paper is to identify the preventable causes of traumatic EMS calls related to its' citizens who are 65 years of age and older. A descriptive method of research was used including a thorough literature review and a review of

available data to answer these questions: 1) What are the primary types of traumatic calls to the older citizens in Corvallis, 2) What are the preventable causes for the traumatic calls to the older citizens of Corvallis, 3) What programs are available nationally for these preventable causes, and 4) What partnerships could CFD form to deliver and provide prevention training and information to the older citizens of Corvallis?

Background and Significance

The City of Corvallis, Oregon, is a medium-sized community located in the central Willamette Valley, approximately 40 miles south of the capital city of Salem, Oregon. Corvallis is the largest city in Benton County and contains roughly two-thirds of the population in Benton County (U.S. Census Bureau, 2012). The City of Corvallis has a population of 54,462 (U.S. Census Bureau, 2012) and experiences an increase of nearly 25,000 during the school year as result of students attending Oregon State University (Raskausn, 2011).

The citizens in Corvallis that are 65 years of age and older currently make up 10.5% (5721) of the total population (Portland State University, 2011). Although this percentage is almost 3% less than the average in all of Oregon, it is a 15.1% increase in the 65 and older group in Corvallis since the 2000 census.

CFD provides services to the City of Corvallis and the Corvallis Rural Fire Protection District (RFPD) in a combined area of 45 square miles. The services provided include fire suppression, rescue, hazardous materials, fire prevention, and emergency medical services (EMS) including transport ambulance services. The prevention division provides services to the community including fire and life safety inspections, fire cause determination investigations, and education activities focused almost completely on the prevention of fire. Education activities include presentations to the elementary schools as well as a nationally respected college campus

fire safety program. CFD EMS and ambulance transport services extend beyond Corvallis to include 634 additional square miles of Benton County.

CFD has put forth significant efforts toward the prevention of fire in the community with a high degree of success as evidenced by our lower-than-average rate of fires and fire loss (Corvallis Fire Department, n.d.) (appendix A). This is the result of a department-wide effort with engine crews performing many of the fire and life safety inspections on local businesses and safety education to the local schools. In contrast, there has been little or no focus placed on identifying, preventing, and decreasing the number of EMS incidents to the aging population in Corvallis. A Fire Prevention Officer with CFD indicates that the prevention division had attempted to implement safety programs for our older citizens about 15 years ago, but abandoned the idea when it met significant resistance (J. Patton, Personal Communication, May 24, 2012).

CFD has always been an advocate of community risk reduction with regard to fire prevention. The successful utilization of the five-E's (education, engineering, enforcement, economic, and emergency response) of risk interventions as outlined in the student manual for the Executive Analysis of Community Risk Reduction (EACRR) class has played a key role in this success in the past (National Fire Academy, 2011). Chapter 3 of the student manual makes it clear that most incidents are the result of a series of events that cause what most people would call an accident. In fact, the author of the student manual indicates that "there is no such thing as an accident" (National Fire Academy, 2011, pp. 3-3). With this concept in mind, CFD intends to intervene by continuing to apply the five-E's to the issue of reducing injuries to the older citizens of Corvallis. This will also work toward accomplishing the first United States Fire Administration (USFA) operational objective of "reducing risk at the local level through prevention and mitigation" (United States Fire Administration, 2012, pp. II-2).

Literature Review

There are large numbers of books, articles, and studies related to all aspects of caring for the aging American population. Most of them recognize the fact that as people age they become more dependent upon others to meet their physical and emotional needs. Assistance is required to accomplish simple, every-day activities such as bathing, getting dressed, eating, and shopping. This information is repeated by many different personal, institutional, and governmental authors. In order to limit the review of literature of this broad category, this report will focus on items related to the statistics, cause, and prevention of injuries to older Americans, and how this relates to the older citizens of Corvallis, Oregon.

One research paper was found through the National Fire Academy (NFA) Executive Fire Officer (EFO) program that addressed the issue of determining the causes of injuries within the author's jurisdiction (Lahart, 2009). This paper identified resources for identifying local causes of injuries as well as groups or organizations with shared concerns of preventing injuries in older citizens.

The U. S. Census Bureau provides current, historic, and predictive information on the population of the United States (U. S. Census Bureau, n.d.). This data is divided many different ways to provide a very broad view of the attributes of the population, or to provide a very narrow and focused view. These narrow views can include or exclude items such as gender, race, education, and housing and income levels, to name a few. Most applicable to this report is the way the age groups are divided and the separation of the search to States, Counties, and Cities. The information gathered from the U. S. Census Bureau for this report will help to provide insight into the current and future scope of the problem.

The U. S. Census Bureau has also performed studies of the past and current data to make educated projections of our future population. One specific study recognizes the upcoming movement of the baby-boomer population into the 65 and older age group over the next 40 years (Vincent & Velkoff, 2010). Their projections indicate that the overall percentage of people in the younger age groups will slightly decline while the percentage of the 65 and older age group increases from 13 percent to almost 20 percent.

Portland State University (PSU) in Portland, Oregon has developed a State Data Center (SDC) within their Population Research Center that focuses specifically on the demographics of counties and cities of Oregon (Portland State University, 2012). The SDC works in partnership with the U.S. Census Bureau to provide useful and pertinent information to the citizens of Oregon. The PSU data used in this report provides a comparison of the 2000 census data and the 2010 census data specifically for the City of Corvallis, Oregon.

The Centers for Disease Control (CDC) provide statistics on various types of traumatic injuries. The first report gives national statistics on nine categories of injuries including drowning, falls, fire-related, firearm-related, homicide/assault, motor vehicle, poisoning, suicide, and traumatic brain injuries (TBI) (Johnson, Thomas, Thomas, & Sarmiento, 2009). These statistics are further broken down to compare states, ages, and gender. This data will be evaluated to identify the leading statewide causes of injury to older citizens.

The second report from the CDC lists the top 10 causes of non-fatal injuries that were treated in emergency rooms nation-wide in 2010 (Centers for Disease Control and Prevention, 2012) (appendix B). At the top of the list is falls with just over 67% of the total on the top ten list. Like the previous document from CDC, this list in not all-inclusive and only shows the most significant causes of injury. This information was compared to the data from CFD.

The third and fourth reports used from the CDC identify the top 10 causes of death. The first of these two takes a broad view of the causes of death and includes both medical and traumatic causes (Centers for Disease Control and Prevention, 2009a) (appendix C). The other of these two reports narrows the view to the top 10 causes of death from traumatic causes (Centers for Disease Control and Prevention, 2009b) (appendix D). This is also divided into various age groups to identify the greatest risk for each group. This information was used to further clarify the answers to the stated problem.

To determine the area of greatest impact in Corvallis information was gathered from the CFD Records Management System (RMS) (CFD RMS, 2012). The data is entered for every emergency and non-emergency call to which CFD responds. Because CFD provides transport ambulance services, there is also extensive information gathered for every patient.

Fire loss data for the CFD was gathered and compiled by the executive assistant to the fire chief and placed into the fire department 2010-2011 annual report (Corvallis Fire Department, n.d.) (appendix A). This data was gathered through the National Fire Incident Reporting System (NFIRS) and through the CFD RMS system (L. Shaha, Personal Communication, May 30, 2012). This data was used to show the positive impact from the efforts of the fire prevention division of CFD, but also to indicate that the current focus is almost completely on the prevention of fires and not on the prevention of injuries.

Information on the causes of falls that occur in the older American age group was found online on two sites. These sites provide practical information with actions that can be taken to decrease the risk of falling. The first site is a group of physicians concerned with preventing injuries and illness (American Academy of Family Physicians, 2000). The second is a

government site that has gathered much information on the topic of fall injury causes, and has provided recommendations for preventing those injuries (National Institute of Health, n.d.).

Resources for the prevention of injuries to older Americans was found online through a number of sources. Previous reference to the CDC in this report provided statistics on the prevalence and severity of injuries. CDC also provides information on how to prevent fall injuries in older Americans (Centers for Disease Control and Prevention, 2010). This web site includes information regarding the combined efforts of CDC with other groups and agencies as well as information on available grants for the implementation of fall prevention programs. This CDC report makes reference of a non-profit group whose mission is to help others share the message about fall injury prevention. Although the Fall Prevention Center of Excellence (FPCE) only operates in California, the information provided on their website could easily be utilized anywhere (Fall Prevention Center of Excellence, 2005). In addition, the National Council on Aging (NCOA) provides a large reference with tools and resources for improving all aspects of aging (National Council on Aging, n.d.). Last is a government run agency whose primary focus is to administer the funds allocated to the federally funded Older Americans Act. The Administration on Aging (AOA) is responsible for creating home and community based services and granting funds to support the health and independence of older Americans (Administration on Aging, 2012).

All of the above information was used to further clarify the problem. Local data were used to determine the true causes of local injuries while state and national data was used to quantify the scope of the problem. The other resources reviewed provided information on actions that have been taken by other communities across America as well as information on grants for

local programs and available resources for those wanting to prevent injuries in their communities.

Procedures

Procedures for this research paper supported a descriptive method and included an extensive literature review and a review of statistical information. The literature review included material from past EFO research papers, articles from fire service and EMS periodicals, and government publications. The statistical information was gathered through the U. S. Census Bureau, CDC, PSU SDC, and CFD RMS system.

The search for EFO papers was conducted through the online NFA Learning Resource Center (LRC). The initial search included all EFO papers that discussed injury prevention strategies targeted toward older citizens. An attempt was made to find any papers that evaluate the process of determining the causes of EMS calls in other communities. The results found in this search revealed many papers covering the topics of preventing fires and preventing falls in older citizens. This author did not want to focus on a national injury problem, but wanted to determine the most common preventable causes of injuries in the city of Corvallis, Oregon. Through a subsequent search using the just the word “older” a report was found that attempted to determine the causes of preventable injuries in the 65 years and older age group (Lahart, 2009). This paper was used to gather information and ideas for ways to evaluate the causes of injury to older citizens.

A search of fire service and EMS books, periodicals, and articles did not provide any useful information for this paper. Every publication evaluated provided statistics that were gathered from other original sources and national injury trends.

An exhaustive search for statistics was conducted using multiple sources. The initial search was through the U.S. Census Bureau (U. S. Census Bureau, n.d.) to determine the current population of Corvallis and how it has changed between the year 2000 and 2010. In addition, the U.S. Census Bureau has conducted research to determine probable trends in population changes and the impact that may have on communities (Vincent & Velkoff, 2010). More detailed information was gathered through the PSU SDC which provides current year-by-year census statistics for all cities throughout Oregon (Portland State University, 2012).

A search for injury and fatality statistics revealed that the CDC has the most extensive data. The first set of data chosen is an overview of national statistics. This identifies the top ten causes of non-fatal injuries and how those causes affect each age group (Centers for Disease Control and Prevention, 2012). The second set of data considers nine causes of injury, but further studies them by state, age, and gender (Johnson, Thomas, Thomas, & Sarmiento, 2009). The third set of data reviewed lists the top ten causes of death (Centers for Disease Control and Prevention, 2009a) (appendix C). This data includes both medical and traumatic causes and is further broken down into various age groups. The last set of data included in this report is the top 10 types of injuries that prove to be fatal (Centers for Disease Control and Prevention, 2009b) (appendix D). All of this data was used to compare with the data found in Corvallis as well as further quantifying the problem statement of this report.

A query of all medical reports was conducted through the CFD RMS system (CFD RMS, 2012). The search included all EMS calls from October 1, 2010 through April 30, 2012. Prior to October of 2010 CFD was using an RMS system that would not support a query of this type. The total number of EMS calls that Corvallis Fire responded to within the city of Corvallis and the Corvallis RFPD was 5849. The search was then narrowed by only including those patients that

were 65 or older at the time of the call, and narrowed again to include only EMS calls of a traumatic nature. Additional factors were considered in an attempt to find the root cause of the traumatic injuries. This included the distance from which the patient fell, past medical history, and medications that the patient is currently prescribed.

A search was conducted to find relevant information regarding the causes of injuries in older Americans. Two sites were identified. The first site provides information from family physicians to their patients (American Academy of Family Physicians, 2000). Many parts of this site deal with preventive care and actions for patients. The specific article used provides information on the causes of falls and ways to decrease their occurrence. The second site is a government site dedicated to health and prevention issues (National Institute of Health, n.d.). This article also discusses the causes and preventive measures for the occurrence of falls in older Americans.

Results

The first research question was to find the primary types of traumatic calls to older citizens in Corvallis. CFD Fire and EMS personnel responded to a total of 5849 calls for emergency medical assistance between October 1, 2010 and April 30, 2012 (CFD RMS, 2012). These calls originated within the city of Corvallis or the Corvallis RFPD. These two specific areas of response were chosen for two reasons. First is that the area listed is where the majority of the population is located, and as a result the vast majority of calls occur in this area. The other reason for the separation is that the city of Corvallis and the Corvallis RFPD are the only two areas within the ambulance response district that CFD has control or influence over in making preventive changes.

The next query made found that 2553 of those 5849 calls for medical assistance (44 percent) were responses to patients that were 65 years of age or older (CFD RMS, 2012). Those EMS calls were separated into two major groups with 1935 calls being medical in nature, while the remaining 618 were traumatic in nature. The 617 traumatic calls for help will be the data set that will be used for the rest of the data queries.

This information was further narrowed to determine the causes of the injuries reported. The results show 11 categories including unknown and blank (CFD RMS, 2012) (table 1). The top two causes of injury was fall injuries accounting for 535 of the 617 (86 percent), and motor vehicle accidents accounting for 37 of the 617 (6 percent). The next highest category was unknown at 30 responses (5 percent), while the remaining three percent was divided fairly evenly between the six remaining categories.

TABLE 1

Injury Categories	
Bicycle accident	3
Bites	3
Fall	535
Machinery accident	1
Motor vehicle accident (non-traffic)	4
Motor vehicle accident (traffic)	33
Motorcycle accident	1
Pedestrian traffic accident	2
Stuck by blunt/thrown object	5
Unknown	30
Grand Total	**617**

Falls were examined further based on the distance the person fell. While the majority of falls occur at ground level (202), the data shows that 106 fell from three feet, 68 fell from four feet, and 57 fell from five feet off the ground (CFD RMS, 2012) (figure 1).

The number of patients transported to the emergency room from these four groups is between 76 and 85 percent with the rest being treated and released or refusing medical care

(table 2). The highest percentage of patients transported involving a fall five feet or less is at 93 percent for those who fell from one foot off the ground. All patients that fell from a distance greater than five feet off the ground were transported.

FIGURE 1

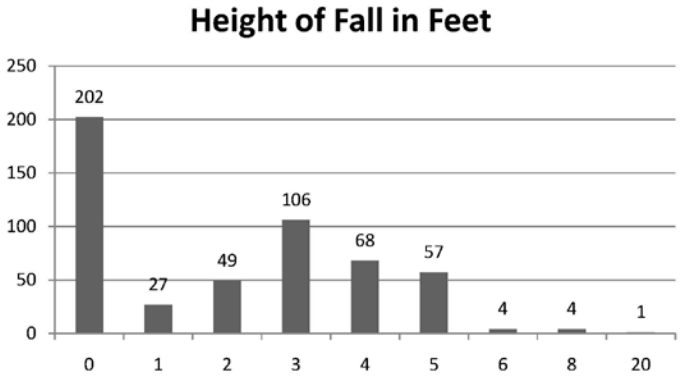


TABLE 2

Number of Patients Transported by Level of Fall

Distance	Number of Patients	Percent Transported
Ground Level	**202**	
Refused Care	12	
Treated and Released	19	
Transported	171	85%
1 Foot	**27**	
Refused Care	1	
Treated and Released	1	
Transported	25	93%
2 Feet	**49**	
Refused Care	7	
Treated and released	5	
Transported	37	76%
3 Feet	**106**	
Refused Care	13	
Treated and released	6	
Transported	87	82%
4 Feet	**68**	
Refused Care	6	
Treated and released	3	
Transported	59	87%
5 Feet	**57**	
Refused Care	6	
Treated and released	5	
Transported	46	81%
6 Feet	**4**	
Transported	4	100%
8 Feet	**4**	
Transported	4	100%
20 Feet	**1**	
Transported	1	100%

Motor vehicle accidents were further evaluated based on the seating location of the injured person. The person injured in the accident was the driver 22 of the 37 incidents (59 percent) with only 16 being transported to the emergency room (CFD RMS, 2012) (table 3). Of the 15 remaining passengers only 3 (20 percent) were transported to the emergency room.

TABLE 3

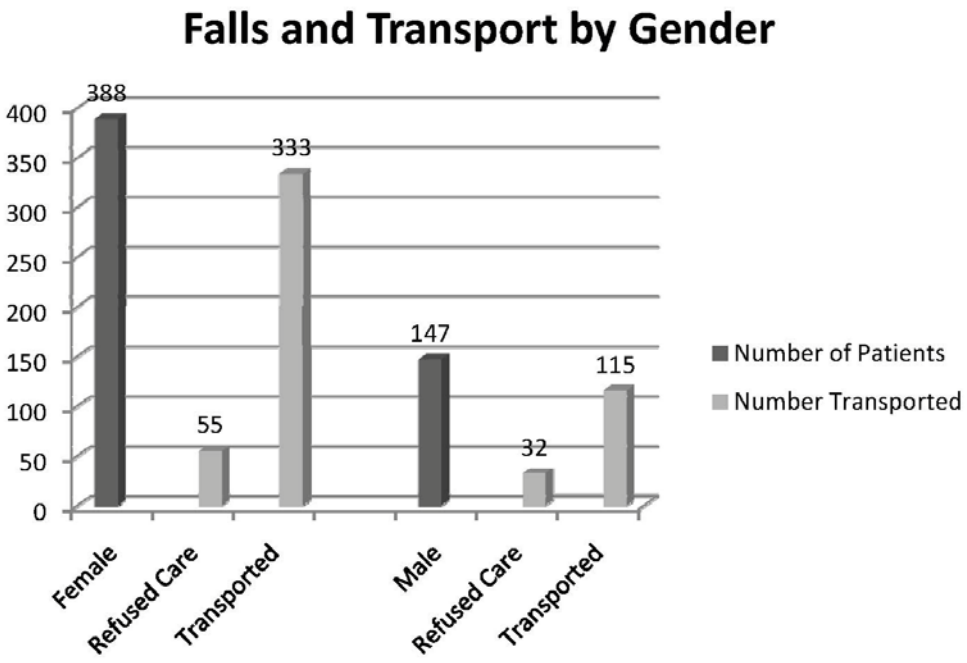
Position of Patient	Number of Patients
Driver	**22**
Refused Care	5
Transported	17
Left (not driver)	**2**
Transported	2
Right	**13**
Refused Care	12
Transported	1

The second research question was to find the preventable causes for the calls to the older citizens of Corvallis. Clearly the data on the cause of injuries indicates that falls are the greatest occurrence in Corvallis (86 percent) and therefore the area where the most emphasis should be placed.

Local data was further reviewed to identify possible contributing factors for the occurrence of falls in Corvallis. The first refinement in the search indicates that 388 of the 535 (72 percent) were women (CFD RMS, 2012) (figure 2). Of the 388 women, 330 (85 percent) were transported by ambulance as compared to 78 percent of men. The data also seems to indicate that men and women are fairly similar regarding the number of medications prescribed as well as the number of items listed in the medical history, although CFD RMS does not clearly separate these items out for quantification. The only quantifiable data regarding medications and medical history is that 39 (7 percent) of the 535 had no medications listed, 33 (6 percent) had no

medical history listed, and 367 (68 percent) are on five or more medications. A couple common themes in the medical history include the presence of arthritis, cardiac issues including high and low blood pressure, Alzheimer's and dementia, stroke, and diabetes. In addition, the frequency with which patients are on more than five medications may increase the potential for a medication error or negative drug interaction (American Academy of Family Physicians, 2000).

Figure 2



All of the data listed above was used to identify potential preventable causes. While gender is not necessarily a cause of the falls, it is an important factor in determining the way in which the prevention message may best be delivered. The number of patients transported is not a cause of the falls either, but it is an indicator of the severity of the injuries received from the fall.

The data that has a more direct relation with the potential prevention of injuries lies in the list of the patient's medical history and the list of patient's medication. "The normal changes of aging, like poor eyesight and poor hearing, can make you more likely to fall" (American Academy of Family Physicians, 2000). In addition, they indicate that illness and physical

conditions, medications side effects, and medication interactions when prescribed multiple medications are very common causes of falls in older citizens. The National Institute of Health (NIH) expands on that list by including muscle weakness, lack of flexibility, low blood pressure, sensory problems, and even confusion (National Institute of Health, n.d.). This list closely matches the list of patient history and prescribed medications found in the CFD RMS data for fall injury responses.

The third question was to determine what programs are available nationally for these preventable causes. Within the area of fall injury prevention alone the available programs are too numerous to list however, three of the resources provide the majority of information included in the remaining sources.

The CDC has provided much of the information on injury statistics used in this report, but they also provide much information on the prevention of falls in older Americans (Centers for Disease Control and Prevention, 2010). Information is provided regarding projects they are working on to improve fall prevention programs, available resources for establishing a program, and available grants to help establish programs. In addition, the CDC has referenced a great resource that currently is only available in California, but a valuable resource none-the-less. The resource is the FPCE which has created numerous useful tools for educators and families (Fall Prevention Center of Excellence, 2005). The intent of the FPCE is not just to get the word out about fall prevention, but to teach others how to get the word out. They also provide information for how to successfully build coalitions in your community.

The NCOA is a non-profit organization that provides many tools and resources for providing assistance to older Americans in all areas of aging including fall injury prevention

(National Council on Aging, n.d.). Their primary focus is using evidence based information to find the best solutions for the challenges that older Americans face.

The last resource is a government agency that creates home and community based services nationally to assist older Americans with the daily challenges they will face as they age. The AOA has been able to provide services the aging population because of money provided through the Federally funded Older Americans Act (Administration on Aging, 2012). Grant money is provided to groups and agencies whose focus is to assist older citizens in maintaining their health and independence. Prior programs funded through these grants that have been implemented in Corvallis include Meals on Wheels and Dial-a-Bus.

The information provided by these resources will assist CFD in a number of ways. First, and most important, is the information will help CFD to identify the most common contributing factors for the fall injuries. That information will allow the department to focus efforts on reducing falls in specific areas of concern. Second would be the potential partnerships with national, state, and local agencies identified by these references. CFD will not be able to effect this change alone. Last is the availability of grants that are listed within the pages of these resources. This prevention effort will have a much greater chance for success with financial backing through grants and partnerships.

The last question was to determine what partnerships CFD could form to deliver and provide prevention training and information to the older citizens of Corvallis. Five potential partnerships were identified.

The first partnership to be explored would be with the Corvallis Senior Center. The senior center has already created information and flyers for fall injury prevention however, they make those available only to patrons of the senior center itself (S. Bagdonovich, Personal

Communication, June 25, 2012). A partnership between the senior center and CFD may provide a wider audience for distributing prevention information regarding falls. Additionally, the two organizations together may be able to acquire additional grants for the purpose of getting information to the citizens.

A partnership with the local retirement living and assisted living operators in the Corvallis area may provide greater opportunities. Because of the independence of the residents at these facilities the information could be shared either in a group setting or in one-on-one meetings and evaluations of their living situations.

The local hospital and related medical facilities may be another potential partner. Whether this is from a financial standpoint or from a public relations standpoint really does not matter. What is important is that the word is getting out to the greatest number of older citizens possible.

In a similar way, a partnership with the local physicians and nurses groups would be very advantageous. These groups are highly recognized and respected in the community. This author's experience on the ambulance indicates that many people trust their doctors and nurses more than family members whether it is medically related information or not. The message these groups give carries a lot of weight with the older community.

The last partnership that may be of significant benefit to the prevention of injury and death is with the medical insurance companies. Decreasing injuries also decreases the amount of money they must pay to cover the medical bills for these injuries. The insurance companies would likely be very interested in finding ways to decrease the number and severity of injuries to their policy holders.

Each of these potential partners has something specific that they can offer to the cause to help make it successful. In addition, each partner also has something to gain. Also, in each of the cases above the author is only suggesting the value if CFD were to partner with one of these organizations alone. There is significant potential for a synergistic result should many or all of these organizations choose to partner together.

Discussion

This report was written to address the primary concern of identifying the preventable causes of traumatic EMS calls to the older citizens of Corvallis, Oregon. Rather than using national data to determine the extent of the local problem the author preferred to review local data for two reasons. The local problem must be clearly identified and studied to understand the local causes and solutions. Additionally, if CFD is seeking support from other local stakeholders the scope of the local problem must be clearly identified and articulated. Stakeholders will want to be certain that their efforts are worth the time and money that they are putting into the solution. While some national and statewide data was used when local data was absent, the majority was taken from CFD's local experience.

The information from the U.S. Census Bureau provides a clear picture of the current population with regard to the 65 year and older age group (U. S. Census Bureau, n.d.), as well as a prediction of the future population within the same age group (Vincent & Velkoff, 2010). With the expected doubling in the population of this age group by 2050 one would also expect the current rate of injuries as described by Johnson, Thomas, Thomas, and Sarmiento (2009) to also double without any preventive measures being taken. It is important to note that this report did not consider the concurrent increase in the overall population. Combining these two factors will place an even greater, yet predictable, burden upon the EMS responders.

The current population in Corvallis of 54,463 (U.S. Census Bureau, 2012) does not make the solution to the problem overwhelming. Even the influx of 25,000 people per day (Raskausn, 2011) as a result of students attending OSU does not directly impact the problem that CFD is facing. That is because very few of the students would be expected to be in the 65 and older age group. Response data from CFD RMS supports this theory with no traumatic EMS calls to the OSU campus for people 65 and older (CFD RMS, 2012). A much greater concern is that the current population of persons 65 and older in Corvallis is about 10.5 percent (5721) of the total population; an increase of 15.1 percent since the 2000 census (Portland State University, 2011). The U.S. Census Bureau (2012) indicates that the average population 65 and older throughout Oregon is 13.9 percent and 13 percent nationally. The concern is that the population in the 65 and older age group could experience a double impact in Corvallis. While most of the rest of Oregon and the United States are increasing from 13 percent to an expected 19 percent, Corvallis will be increasing from 10.5 percent to 19 percent. This may suggest that an opportunity for prevention efforts could be focused in two areas. First would be providing information to older citizens that are moving into the Corvallis area for the first time. The other would be to lower the age at which the prevention message is first shared. This would mean reaching out to those who are 55 to 64 years of age. This effort would attempt to reach those baby boomers that will be moving into the 65 and older age group as suggested by Vincent and Velkoff (2010).

Information from the CDC provided data and statistics for comparison with local data. A report of the top nine categories of injuries to those 65 years and older indicates that falls are clearly the number one cause nation-wide (Johnson, Thomas, Thomas, & Sarmiento, 2009). They further indicate that in Oregon about 79 percent of those reported injuries are a result of falls. In another report the CDC shows that fall injuries account for just over 65 percent of all

injuries treated in the emergency room nation-wide (Centers for Disease Control and Prevention, 2012) (appendix B). Data taken from CFD RMS indicate that 535 out of 618 (86 percent) of the traumatic EMS calls in Corvallis are a result of falls (CFD RMS, 2012). While the experience in Corvallis seems slightly higher than the experience of Oregon and the United States, it is unclear whether this is a significant finding. Because the methods of data collection are not clearly indicated in either of the CDC reports, the author will be accepting the data at face value with the understanding that further research will be necessary to determine the true significance. Two additional CDC reports identify traumatic causes of death for citizens 65 and older provide and further support for the risks to this population. The first includes both medical and traumatic, while the second only considers traumatic causes of death (Centers for Disease Control and Prevention, 2009a) (Centers for Disease Control and Prevention, 2009b) (appendices C and D). The older citizens of Corvallis seem to be in line with the percentage of falls as experienced in the state of Oregon, but are approximately 20 percent higher than the national average. This would indicate that the problem of falls is a significant problem not only in Corvallis, but throughout Oregon as well. Consideration should be given to the idea that a local fall prevention program be developed that could easily be distributed and utilized throughout Oregon.

The CFD RMS system was invaluable in providing the data necessary for determining the extent of each cause of traumatic EMS calls. The 65 and older population currently accounts for 44 percent (2553) of the total calls for medical care in Corvallis (CFD RMS, 2012). Surprisingly, only 24 percent (618) of the 2553 were the result of some type of injury, however, the majority of those injuries (86 percent) were the result of falling down. Looking at these numbers based on the total number of EMS calls in Corvallis shows that 10.5 percent are the result of injuries to citizens 65 years and older.

All causes of injury were evaluated based on the categories listed in the CFD RMS system. Of the 618 EMS calls that CFD responded to where an injury involved a person 65 years or older the data shows that 535 (86 percent) were the result of falls. The next highest cause was motor vehicle accidents with 37 (6 percent) incidents. The remaining 46 incidents (8 percent) were fairly evenly divided between the causes of bicycle, bites, machinery, motorcycle, and struck by an object. While there may be some benefit to determining preventable causes for the remaining mechanisms of injury, the author determined that based on the high percentage of fall incidents shown in the data that the primary focus and prevention effort should initially be placed on falls. When more data has been gathered and efforts have been initiated toward preventing falls, subsequent prevention efforts can be determined and implemented.

Helpful information was gathered regarding the distance from which the person fell. Of the 535 falls that were documented, 202 (37 percent) were said to be from ground level with another 231 (43 percent) being shared from three to five feet (CFD RMS, 2012). This information could be viewed from two different perspectives. The first is that since 202 incidents are a result of falls from a single reference level of the ground that the majority of effort should be placed into ground level fall prevention. This could be supported by the information that only 27 fell from one foot above ground level, 49 from two feet above ground level, 106 from 3 feet, 68 from 4 feet, and 57 from 5 feet. Clearly the ground level is the most common single distance from which people have fallen and received an injury. From a different perspective, only 202 people fell while they were at ground level while 333 people fell from some level above the ground. Prevention efforts may best be focused first on keeping older citizens from performing tasks anywhere other than ground level. As a secondary effort the traditional fall prevention information could be distributed.

There was a distinct difference found between the number of women and men injured as a result of falls. The data from Corvallis indicates that CFD responds to three-times more women than men who are injured from a fall (CFD RMS, 2012). One thing to consider when evaluating this data is that there is no way to track the number of falls that occur where a person is injured but does not call for EMS assistance. This author believes more data is necessary to determine the true difference in the frequency of fall injuries between men and women. Based on the data presented, it would appear that a greater emphasis should be placed on preventing falls in women. Through a partnership with the Corvallis Senior Center and the retirement and assisted living facilities better data may be obtained on falls that occur without calling for EMS.

The medical history and medication history of each fall injury case was evaluated to determine if there are common themes. Common themes were used because of the inability of the RMS system to search for specific history or medication occurrences. As a result, this information is not definitive data that could be used to determine preventable causes, but rather used determine possible trends. The author included this information based on the suggestion from the American Academy of Family Physicians (AAFP) (2000) and the National Institute of Health (n.d.) that medical history and current medications may be an indicator of risk. The data from Corvallis shows that almost three-quarters of the older citizens that we responded to have multiple items on their medical history and about the same number are on more than four different medications (CFD RMS, 2012). Even though this information is not searchable to gain specific statistics there are some visible trends. The first trend observed by the author is that there are several common medical history entries listed. They include heart related histories such as heart failure and atrial fibrillation, diabetes, arthritis, and Alzheimer's and dementia. The common themes for the medication lists are pain management medications such as Tylenol,

aspirin, ibuprofen, and several narcotics, diabetes medications, and heart medications. The point of highlighting these common themes is only to suggest that the true cause of the fall may be something other than a slip or a trip. Poor eyesight and poor hearing, as indicated by the AAFP (2000), are normal changes in life that make a person more likely to fall. The NIH (n.d.) suggests that many of the causes of falls, such as muscle weakness, lack of flexibility, low blood pressure, sensory problems, and even confusion can be significant contributing factors with falls. They also suggest that medication interactions are a common cause of the above stated contributing factors. Prevention efforts may need to be focused toward a program that works closely with doctors, nurses, and medical facilities in general to identify those citizens who may be at risk for a fall with a resulting injury. Sharing fall injury risk information with family members may also encourage more interaction with the family physician.

A local fall prevention program could benefit from one or more of the national fall prevention programs. Before deciding which program is best for the older citizens of Corvallis it will be important to decide where the focus should be placed. Data and information already evaluated indicates that falls above ground level, falls involving women, and medical history and medication interactions may be the areas that should be focused on first. That does not discount areas or ideas that this author has not yet explored, but with the information currently available these appear to be the primary causes.

The CDC (2010), AOA (2012), FPCE (Fall Prevention Center of Excellence, 2005), and the NCOA (n.d.) all provide useful tools and information on the prevention of falls in older Americans. The CDC uses statistical information to focus their efforts on creating injury prevention programs. These programs are made available to the public for personal use and to organizations. They are actively seeking partnerships in an effort to improve their effectiveness

in both development and implementation of programs. The AOA focuses on home and community based services to help aging Americans cope with the challenges they face. They are also responsible for the administration of the monies that have been federally allotted through the Older Americans Act. The FPCE is a California based non-profit organization that provides assistance to people and organizations that want to teach others about fall injury prevention. They don't have the resources to provide the services themselves, but they pride themselves on being able to prepare and support others who are able to teach. Finally, the NCOA is a non-profit organization that focuses on assisting older Americans in all areas of aging. Each of these resources can potentially be used at different points in the plan that Corvallis develops. It is also important to keep in mind that people learn differently. Being able to provide the same information in multiple forms increases the chance that the public is receiving the message.

Establishing partnerships may be the most difficult challenge of establishing a successful fall prevention program. At face value it would appear that building a fall prevention program is a noble task. Differing missions, values, and goals in organizations may cause tension as well as the desire to be in complete control of where and how the money is spent. Establishing a clear mission statement, vision, and goals, and being able to communicate that to the potential stakeholders will be a key point.

The two easiest partnerships to establish will be with the Corvallis Senior Center and with the local retirement and assisted living organizations. Each is already aware of most of the factors surrounding this problem and could be easily convinced that combined efforts would be more effective. Partnering with the local hospital may be a bit more difficult. The hospital would be facing conflicting values or mission since it is in the community to provide care once an incident has occurred and it must be able to make a profit. Prevention of injuries would be

beneficial to the hospital through the positive public relations. Again, establishing a mutual mission, vision, and goals would be the key to this partnership. Even more difficult would be partnering with the local physicians and nurses groups in the community. The difficulty here arises because everyone will have different ideas of how the project should be approached. It would almost need to be approached on a one-on-one basis. The benefit to gaining this partnership is that doctors and nurses are respected professionals in the community that have the opportunity to discuss health related matters. They may also be able to obtain information about falls that were not otherwise reported. The last partnership that may be beneficial would be with medical insurance companies. This could be in the form of providing some of the money needed for the materials and supplies, or it could be in the form of reduced premiums for all older citizens that complete specified training and/or participates in a home inspection program.

Recommendations

The following recommendations are the result of data and research information gathered. These can be separated into two main areas – short-term and long-term recommendations. Short-term solutions should consider implementing solutions within a 5 to 10 year period, and long-term solutions should be looking further into the future. All of the items listed can be applied to both short-term and long-term agendas. A guiding coalition with representatives from each partnering group can help identify the ongoing short-term and long-term issues.

The first recommendation in the injury prevention efforts for CFD is to focus on fall injuries. While there are other causes of injuries noted, the most benefit would be gained by starting with falls. The short term focus should be placed on preventing falls involving women and preventing falls above ground level. These two areas account for most of the EMS calls to

which Corvallis EMS responded. Ultimately, additional research would need to be conducted in both areas to determine what specifically is causing people to fall.

CFD will then need to determine the best method for distributing the prevention message. Multiple methods will likely yield greater results than one distribution method alone. CFD may choose to attempt a shotgun approach by sharing the message through all available avenues, or it may want to conduct research to determine the most effective method in an effort to maximize its' efforts. This should be decided by the guiding coalition.

The second recommendation is to conduct further research into the root causes of fall injuries in Corvallis. This can be accomplished a couple different ways. First would be for CFD to gather and capture more specific data in the CFD RMS system regarding fall injuries. The specific information to be gathered would need to be determined and shared with all CFD personnel. Data may include items such as dizziness, weakness, or stumbling prior to the fall. The data may also provide a method of quantifying the patient history and medications to identify potential high risk groups. Another way would be to have the Corvallis Senior Center and the retirement and assisted living facilities help in gathering the same data. They may choose to send out questionnaires, or they may choose to go door-to-door to speak directly with older citizens. The third way would be to conduct the same research through doctor's offices and hospitals. Having these groups conduct the research may uncover information about those falls that occur without causing injury. The more data on the true causes of falls that can be gathered the more focused the efforts will be in preventing falls.

The last recommendation is to identify and establish partnerships with all potential agencies that may have an interest in preventing injuries in the older citizens of Corvallis. The partners listed in this research paper would be a good starting point, but other local groups may

also be interested in assisting with this effort. These may include religious groups, civic groups, and established foundations. Utilizing the media to share the concern and effort being placed into this problem may help to identify unsuspecting people or groups to assist.

Based on the predictions by the U.S. Census Bureau it will be necessary to continue to evaluate the problem over the next 40 years (Vincent & Velkoff, 2010) and adjust the focus and approach to preventing injuries to older citizens of Corvallis. Without the ongoing effort of gathering and evaluating data, CFD may place prevention efforts where there is little or no problem. As stated earlier, the author did not want to identify prevention efforts and methods based on the experiences of other communities. By focusing on the true causes of the local problem based on local data, CFD has a good chance of making a real impact on preventing injuries in the 65 and older age group.

References

Administration on Aging. (2012). *AoA Programs.* Retrieved June 10, 2012, from: http://www.aoa.gov/AoARoot/AoA_Programs/index.aspx

American Academy of Family Physicians. (2000). *What Causes Falls in the Eldery; How Can I Prevent a Fall.* Retrieved June 8, 2012, from: http://www.aafp.org/afp/2000/0401/p2173.html

Centers for Disease Control and Prevention. (2009a). *10 Leading Causes of Death by Age Group.* Retrieved May 20, 2012, from: http://www.cdc.gov/Injury/wisqars/pdf/10LCD-Age-Grp-US-2009-a.pdf

Centers for Disease Control and Prevention. (2009b). *10 Leading Causes of Injury Deaths by Age Group.* Retrieved May 21, 2012, from: http://www.cdc.gov/Injury/wisqars/pdf/Leading_Causes_Injury_Deaths_Age_Group_Highlighting_Violence-Related%20Injury_Deaths_US_2009-a.pdf

Centers for Disease Control and Prevention. (2010). *CDC Falls Prevention Activities.* Retrieved June 10, 2012, from: http://www.cdc.gov/HomeandRecreationalSafety/Falls/FallsPreventionActivity.html

Centers for Disease Control and Prevention. (2012). *Causes of Non-Fatal Injuries Treated in Hospital Emergency Rooms - 2010.* Retrieved April 27, 2012, from: http://www.cdc.gov/Injury/wisqars/pdf/National_Estim_10_Leading_Causes_Nonfatal_Injuries_Tx_Hospital-ED_US2010-a.pdf

CFD RMS. (2012, April 16). Records Management System. Corvallis, OR.

Corvallis Fire Department. (n.d.). *2010-2011 Annual Report.* Retrieved May 31, 2012, from: http://www.ci.corvallis.or.us/downloads/fire/1011%20Annual%20Report.pdf

Fall Prevention Center of Excellence. (2005). *Stopfalls.org: Stopping Falls One Step at a Time.* Retrieved June 10, 2012, from: http://www.stopfalls.org/

Johnson, R., Thomas, R., Thomas, K., & Sarmiento, K. (2009). *State Injury Indicators Report: Fourth Edition - 2005 Data.* Atlanta, GA: Centers for Disease Control and Prevention, National Center for Injury Prevention and Control.

Lahart, B. (2009). *Older Adult Risk Reduction Analysis for the Denton Fire Department.* Emmitsburg, MD: National Fire Academy.

National Council on Aging. (n.d.). *Center for Healthy Aging.* Retrieved June 10, 2012, from: http://www.ncoa.org/improve-health/center-for-healthy-aging/falls-prevention/

National Fire Academy. (2011). Executive Analysis of Community Risk Reduction - Student Manual. Emmitsburg, MD: United States Fire Administration.

National Institute of Health. (n.d.). *Falls and Older Adults; Causes and Risk Factors.* Retrieved June 8, 2012, from: http://nihseniorhealth.gov/falls/causesandriskfactors/01.html

Portland State University. (2011). *2010 Census Profiles - Oregon Cities A-C.* Retrieved April 13, 2012, from: http://www.pdx.edu/prc/sites/www.pdx.edu.prc/files/2010%20SF1%20Cities%20A-C.pdf

Portland State University. (2012). *Oregon Census State Data Center*. Retrieved April 27, 2012, from: http://pdx.edu/prc/oregon-census-state-data-center

Raskausn. (2011). *OSU Breaks Enrollment Record Again.* Retrieved April 6, 2012, from: http://blogs.oregonstate.edu/uhdsnews/2011/11/11/osu-breaks-enrollment-records-again/

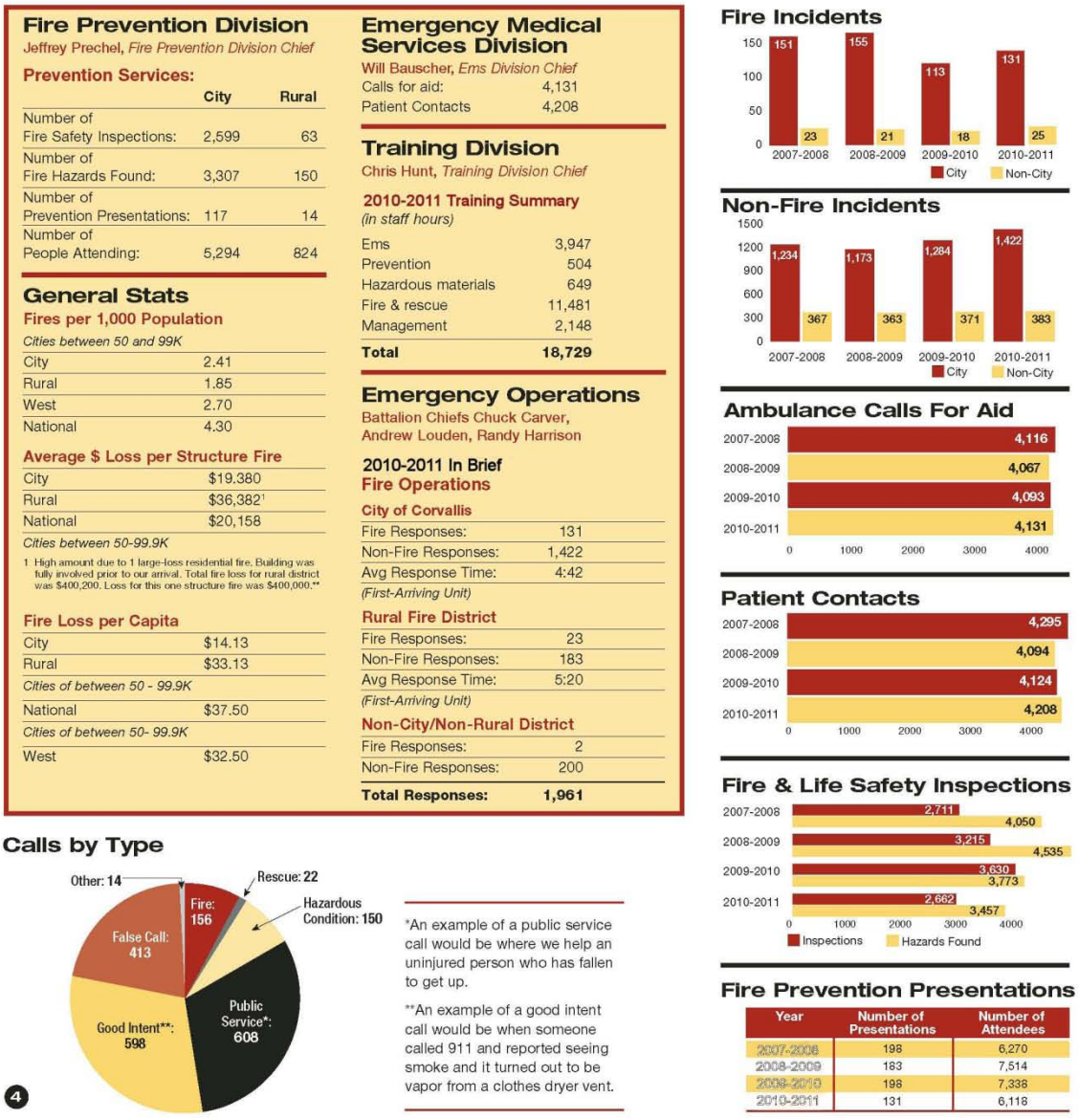
U. S. Census Bureau. (n.d.). *U. S. Census Bureau Main Page*. Retrieved April 27, 2012, from: http://www.census.gov/

U.S. Census Bureau. (2012). *Quick Facts - Corvallis (city) Oregon.* Retrieved April 6, 2012, from: http://quickfacts.census.gov/qfd/states/41/4115800.html

United States Fire Administration. (2012). *Applied Research Guidelines.* Retrieved June 22, 2012, from: http://www.usfa.fema.gov/downloads/pdf/efop_guidelines.pdf

Vincent, G. K., & Velkoff, V. A. (2010). *The Next Four Decades: The Older Population in the United States - 2010 to 2050.* Washington, D.C.: U.S. Census Bureau.

Appendix A



Fire Prevention Division

Jeffrey Prechel, *Fire Prevention Division Chief*

Prevention Services:

	City	Rural
Number of Fire Safety Inspections:	2,599	63
Number of Fire Hazards Found:	3,307	150
Number of Prevention Presentations:	117	14
Number of People Attending:	5,294	824

General Stats

Fires per 1,000 Population

Cities between 50 and 99K

City	2.41
Rural	1.85
West	2.70
National	4.30

Average $ Loss per Structure Fire

City	$19.380
Rural	$36,382[1]
National	$20,158

Cities between 50-99.9K

1 High amount due to 1 large-loss residential fire. Building was fully involved prior to our arrival. Total fire loss for rural district was $400,200. Loss for this one structure fire was $400,000.**

Fire Loss per Capita

City	$14.13
Rural	$33.13
Cities of between 50 - 99.9K	
National	$37.50
Cities of between 50- 99.9K	
West	$32.50

Emergency Medical Services Division

Will Bauscher, *Ems Division Chief*

Calls for aid:	4,131
Patient Contacts	4,208

Training Division

Chris Hunt, *Training Division Chief*

2010-2011 Training Summary

(in staff hours)

Ems	3,947
Prevention	504
Hazardous materials	649
Fire & rescue	11,481
Management	2,148
Total	**18,729**

Emergency Operations

Battalion Chiefs Chuck Carver, Andrew Louden, Randy Harrison

2010-2011 In Brief
Fire Operations

City of Corvallis

Fire Responses:	131
Non-Fire Responses:	1,422
Avg Response Time:	4:42
(First-Arriving Unit)	

Rural Fire District

Fire Responses:	23
Non-Fire Responses:	183
Avg Response Time:	5:20
(First-Arriving Unit)	

Non-City/Non-Rural District

Fire Responses:	2
Non-Fire Responses:	200
Total Responses:	**1,961**

Fire Incidents

Non-Fire Incidents

Ambulance Calls For Aid

Patient Contacts

Fire & Life Safety Inspections

Fire Prevention Presentations

Year	Number of Presentations	Number of Attendees
2007-2008	198	6,270
2008-2009	183	7,514
2009-2010	198	7,338
2010-2011	131	6,118

Calls by Type

*An example of a public service call would be where we help an uninjured person who has fallen to get up.

**An example of a good intent call would be when someone called 911 and reported seeing smoke and it turned out to be vapor from a clothes dryer vent.

4

Taken from the CFD 2010/2011 Annual Report, p. 4

Appendix B

National Estimates of the 10 Leading Causes of Nonfatal Injuries Treated in Hospital Emergency Departments, United States – 2010

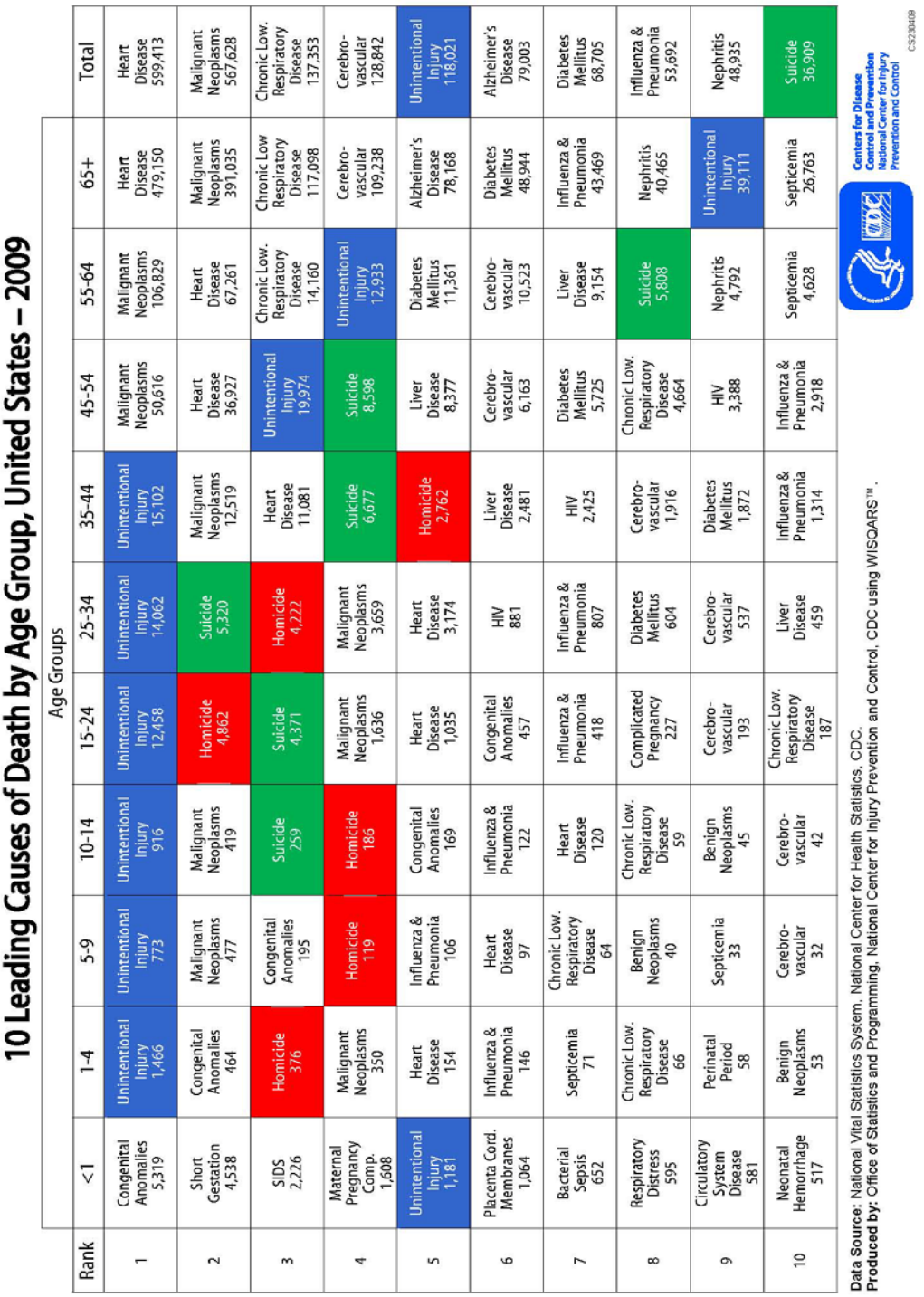
Rank	Age Groups: <1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65+	Total
1	Unintentional Fall 146,804	Unintentional Fall 970,793	Unintentional Fall 649,460	Unintentional Fall 627,418	Unintentional Struck By/Against 1,039,307	Unintentional Fall 834,102	Unintentional Fall 794,258	Unintentional Fall 988,097	Unintentional Fall 860,611	Unintentional Fall 2,350,009	Unintentional Fall 9,146,026
2	Unintentional Struck By/Against 32,933	Unintentional Struck By/Against 397,005	Unintentional Struck By/Against 421,482	Unintentional Struck By/Against 613,885	Unintentional Fall 924,187	Unintentional Overexertion 680,337	Unintentional Overexertion 582,155	Unintentional Overexertion 485,080	Unintentional Struck By/Against 247,623	Unintentional Struck By/Against 254,596	Unintentional Struck By/Against 4,565,133
3	Unintentional Other Bite/Sting 11,937	Unintentional Other Bite/Sting 157,756	Unintentional Cut/Pierce 116,067	Unintentional Overexertion 309,961	Unintentional Overexertion 752,572	Unintentional Struck By/Against 647,509	Unintentional Struck By/Against 488,626	Unintentional Struck By/Against 421,944	Unintentional Overexertion 241,380	Unintentional Overexertion 196,972	Unintentional Overexertion 3,430,040
4	Unintentional Foreign Body 10,221	Unintentional Foreign Body 140,687	Unintentional Other Bite/Sting 101,982	Unintentional Cut/Pierce 137,375	Unintentional MV-Occupant 741,398	Unintentional MV-Occupant 587,529	Unintentional MV-Occupant 437,360	Unintentional MV-Occupant 386,741	Unintentional MV-Occupant 226,750	Unintentional MV-Occupant 194,850	Unintentional MV-Occupant 2,764,332
5	Unintentional Other Specified 9,594	Unintentional Overexertion 95,002	Unintentional Pedal Cyclist 82,145	Unintentional Pedal Cyclist 110,602	Other Assault* Struck By/Against 509,388	Unintentional Cut/Pierce 413,117	Unintentional Cut/Pierce 319,336	Unintentional Cut/Pierce 292,052	Unintentional Cut/Pierce 182,614	Unintentional Cut/Pierce 140,823	Unintentional Cut/Pierce 2,143,400
6	Unintentional Fire/Burn 8,046	Unintentional Cut/Pierce 87,015	Unintentional Overexertion 80,667	Unintentional Unknown/ Unspecified 96,919	Unintentional Cut/Pierce 448,110	Other Assault* Struck By/Against 354,320	Unintentional Other Specified 228,854	Unintentional Other Specified 268,682	Unintentional Other Specified 114,117	Unintentional Poisoning 89,706	Other Assault* Struck By/Against 1,439,235
7	Unintentional Cut/Pierce 6,891	Unintentional Other Specified 73,524	Unintentional MV-Occupant 65,611	Unintentional MV-Occupant 82,439	Unintentional Other Specified 253,982	Unintentional Other Specified 227,591	Other Assault* Struck By/Against 217,057	Unintentional Poisoning 180,548	Unintentional Poisoning 94,553	Unintentional Other Bite/Sting 75,349	Unintentional Other Specified 1,278,313
8	Unintentional Inhalation/ Suffocation 6,354	Unintentional Fire/Burn 52,367	Unintentional Foreign Body 61,816	Other Assault* Struck By/Against 81,053	Unintentional Other Bite/Sting 187,654	Unintentional Other Bite/Sting 178,893	Unintentional Other Bite/Sting 139,579	Other Assault* Struck By/Against 172,185	Unintentional Other Bite/Sting 91,889	Unintentional Other Transport 71,200	Unintentional Other Bite/Sting 1,145,713
9	Unintentional Overexertion 5,849	Unintentional Poisoning 43,939	Unintentional Dog Bite 42,199	Unintentional Other Bite/Sting 60,875	Unintentional Unknown/ Unspecified 158,726	Unintentional Poisoning 126,889	Unintentional Poisoning 137,559	Unintentional Other Bite/Sting 139,798	Other Assault* Struck By/Against 56,834	Unintentional Other Specified 57,118	Unintentional Poisoning 831,295
10	Unintentional MV-Occupant 5,555	Unintentional Unknown/ Unspecified 42,080	Unintentional Other Transport 41,378	Unintentional Other Transport 48,822	Unintentional Poisoning 133,613	Unintentional Unknown/ Unspecified 104,324	Unintentional Unknown/ Unspecified 81,659	Unintentional Other Transport 76,369	Unintentional Other Transport 50,145	Unintentional Unknown/ Unspecified 50,813	Unintentional Unknown/ Unspecified 687,871

*The "Other Assault" category includes all assaults that are **not** classified as sexual assault. It represents the majority of assaults.
Data Source: NEISS All Injury Program operated by the Consumer Product Safety Commission (CPSC).
Produced by: Office of Statistics and Programming, National Center for Injury Prevention and Control, CDC using WISQARS™.

Centers for Disease Control and Prevention
National Center for Injury Prevention and Control

CS230409

Appendix C



10 Leading Causes of Death by Age Group, United States – 2009

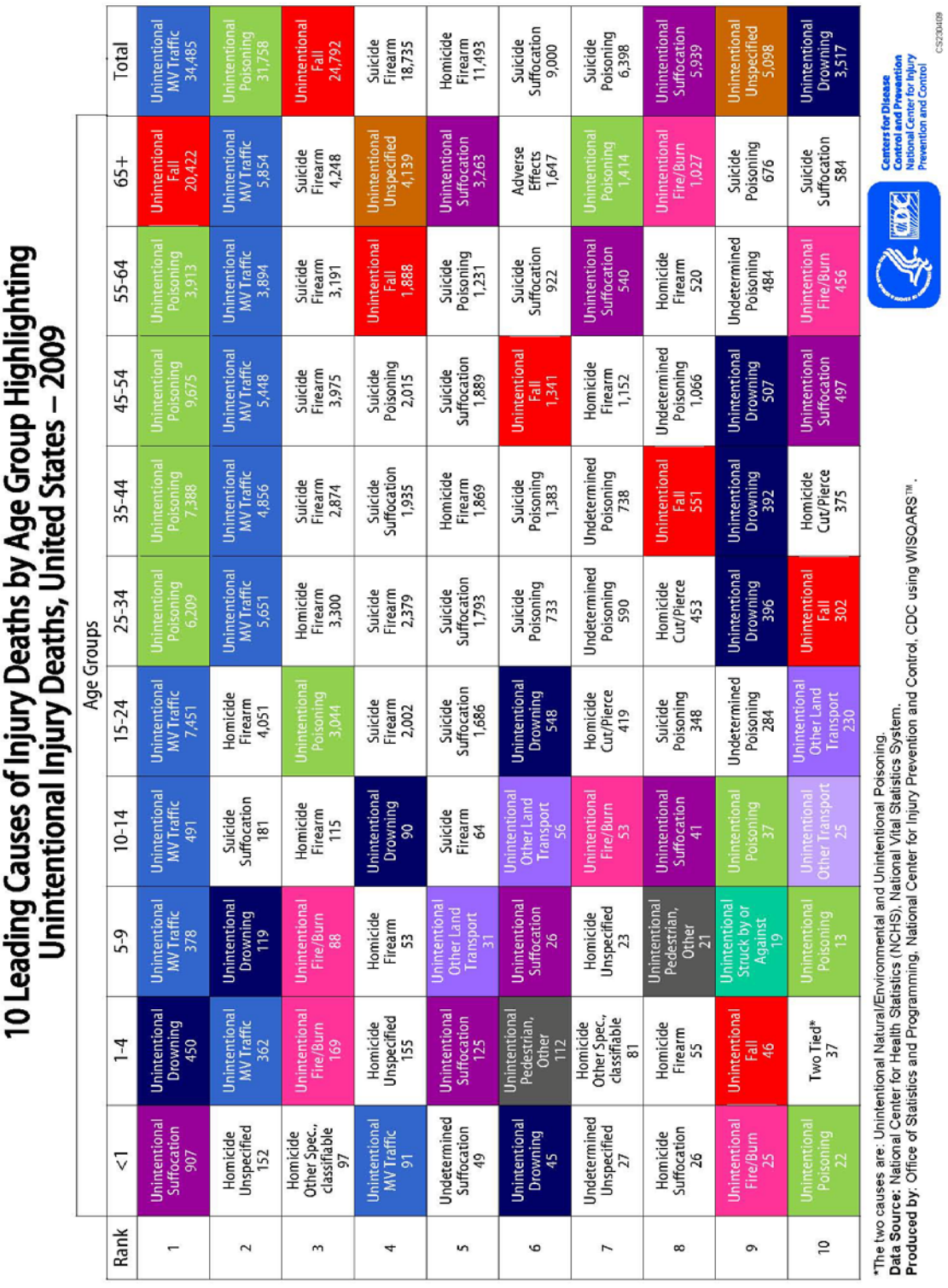
Rank	Age Groups										
	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65+	Total
1	Congenital Anomalies 5,319	Unintentional Injury 1,466	Unintentional Injury 773	Unintentional Injury 916	Unintentional Injury 12,458	Unintentional Injury 14,062	Unintentional Injury 15,102	Malignant Neoplasms 50,616	Malignant Neoplasms 106,829	Heart Disease 479,150	Heart Disease 599,413
2	Short Gestation 4,538	Congenital Anomalies 464	Malignant Neoplasms 477	Malignant Neoplasms 419	Homicide 4,862	Suicide 5,320	Malignant Neoplasms 12,519	Heart Disease 36,927	Heart Disease 67,261	Malignant Neoplasms 391,035	Malignant Neoplasms 567,628
3	SIDS 2,226	Homicide 376	Congenital Anomalies 195	Suicide 259	Suicide 4,371	Homicide 4,222	Heart Disease 11,081	Unintentional Injury 19,974	Chronic Low. Respiratory Disease 14,160	Chronic Low Respiratory Disease 117,098	Chronic Low. Respiratory Disease 137,353
4	Maternal Pregnancy Comp. 1,608	Malignant Neoplasms 350	Homicide 119	Homicide 186	Malignant Neoplasms 1,636	Malignant Neoplasms 3,659	Suicide 6,677	Suicide 8,598	Unintentional Injury 12,933	Cerebro-vascular 109,238	Cerebro-vascular 128,842
5	Unintentional Injury 1,181	Heart Disease 154	Influenza & Pneumonia 106	Congenital Anomalies 169	Heart Disease 1,035	Heart Disease 3,174	Homicide 2,762	Liver Disease 8,377	Diabetes Mellitus 11,361	Alzheimer's Disease 78,168	Unintentional Injury 118,021
6	Placenta Cord. Membranes 1,064	Influenza & Pneumonia 146	Heart Disease 97	Influenza & Pneumonia 122	Congenital Anomalies 457	HIV 881	Liver Disease 2,481	Cerebro-vascular 6,163	Cerebro-vascular 10,523	Diabetes Mellitus 48,944	Alzheimer's Disease 79,003
7	Bacterial Sepsis 652	Septicemia 71	Chronic Low. Respiratory Disease 64	Heart Disease 120	Influenza & Pneumonia 418	Influenza & Pneumonia 807	HIV 2,425	Diabetes Mellitus 5,725	Liver Disease 9,154	Influenza & Pneumonia 43,469	Diabetes Mellitus 68,705
8	Respiratory Distress 595	Chronic Low. Respiratory Disease 66	Benign Neoplasms 40	Chronic Low. Respiratory Disease 59	Complicated Pregnancy 227	Diabetes Mellitus 604	Cerebro-vascular 1,916	Chronic Low. Respiratory Disease 4,664	Suicide 5,808	Nephritis 40,465	Influenza & Pneumonia 53,692
9	Circulatory System Disease 581	Perinatal Period 58	Septicemia 33	Benign Neoplasms 45	Cerebro-vascular 193	Cerebro-vascular 537	Diabetes Mellitus 1,872	HIV 3,388	Nephritis 4,792	Unintentional Injury 39,111	Nephritis 48,935
10	Neonatal Hemorrhage 517	Benign Neoplasms 53	Cerebro-vascular 32	Cerebro-vascular 42	Chronic Low. Respiratory Disease 187	Liver Disease 459	Influenza & Pneumonia 1,314	Influenza & Pneumonia 2,918	Septicemia 4,628	Septicemia 26,763	Suicide 36,909

Data Source: National Vital Statistics System, National Center for Health Statistics, CDC.
Produced by: Office of Statistics and Programming, National Center for Injury Prevention and Control, CDC using WISQARS™.

Centers for Disease Control and Prevention
National Center for Injury Prevention and Control

CS230409

Appendix D



10 Leading Causes of Injury Deaths by Age Group Highlighting Unintentional Injury Deaths, United States – 2009

Rank	Age Groups											
	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65+	Total
1	Unintentional Suffocation 907	Unintentional Drowning 450	Unintentional MV Traffic 378	Unintentional MV Traffic 491	Unintentional MV Traffic 7,451	Unintentional Poisoning 6,209	Unintentional Poisoning 7,388	Unintentional Poisoning 9,675	Unintentional Poisoning 3,913	Unintentional Fall 20,422	Unintentional MV Traffic 34,485
2	Homicide Unspecified 152	Unintentional MV Traffic 362	Unintentional Drowning 119	Suicide Suffocation 181	Homicide Firearm 4,051	Unintentional MV Traffic 5,651	Unintentional MV Traffic 4,856	Unintentional MV Traffic 5,448	Unintentional MV Traffic 3,894	Unintentional MV Traffic 5,854	Unintentional Poisoning 31,758
3	Homicide Other Spec., classifiable 97	Unintentional Fire/Burn 169	Unintentional Fire/Burn 88	Homicide Firearm 115	Unintentional Poisoning 3,044	Homicide Firearm 3,300	Suicide Firearm 2,874	Suicide Firearm 3,975	Suicide Firearm 3,191	Suicide Firearm 4,248	Unintentional Fall 24,792
4	Unintentional MV Traffic 91	Homicide Unspecified 155	Homicide Firearm 53	Unintentional Drowning 90	Suicide Firearm 2,002	Suicide Firearm 2,379	Suicide Suffocation 1,935	Suicide Poisoning 2,015	Unintentional Fall 1,888	Unintentional Unspecified 4,139	Suicide Firearm 18,735
5	Undetermined Suffocation 49	Unintentional Suffocation 125	Unintentional Other Land Transport 31	Suicide Firearm 64	Suicide Suffocation 1,686	Suicide Suffocation 1,793	Homicide Firearm 1,869	Suicide Suffocation 1,889	Suicide Poisoning 1,231	Unintentional Suffocation 3,263	Homicide Firearm 11,493
6	Unintentional Drowning 45	Unintentional Pedestrian, Other 112	Unintentional Suffocation 26	Unintentional Other Land Transport 56	Unintentional Drowning 548	Suicide Poisoning 733	Suicide Poisoning 1,383	Unintentional Fall 1,341	Suicide Suffocation 922	Adverse Effects 1,647	Suicide Suffocation 9,000
7	Undetermined Unspecified 27	Homicide Other Spec., classifiable 81	Homicide Unspecified 23	Unintentional Fire/Burn 53	Homicide Cut/Pierce 419	Undetermined Poisoning 590	Undetermined Poisoning 738	Homicide Firearm 1,152	Unintentional Suffocation 540	Unintentional Poisoning 1,414	Suicide Poisoning 6,398
8	Homicide Suffocation 26	Homicide Firearm 55	Unintentional Pedestrian, Other 21	Unintentional Suffocation 41	Suicide Poisoning 348	Homicide Cut/Pierce 453	Unintentional Fall 551	Undetermined Poisoning 1,066	Homicide Firearm 520	Unintentional Fire/Burn 1,027	Unintentional Suffocation 5,939
9	Unintentional Fire/Burn 25	Unintentional Fall 46	Unintentional Struck by or Against 19	Unintentional Poisoning 37	Undetermined Poisoning 284	Unintentional Drowning 396	Unintentional Drowning 392	Unintentional Drowning 507	Undetermined Poisoning 484	Suicide Poisoning 676	Unintentional Unspecified 5,098
10	Unintentional Poisoning 22	Two Tied* 37	Unintentional Poisoning 13	Unintentional Other Transport 25	Unintentional Other Land Transport 230	Unintentional Fall 302	Homicide Cut/Pierce 375	Unintentional Suffocation 497	Unintentional Fire/Burn 456	Suicide Suffocation 584	Unintentional Drowning 3,517

*The two causes are: Unintentional Natural/Environmental and Unintentional Poisoning.
Data Source: National Center for Health Statistics (NCHS), National Vital Statistics System.
Produced by: Office of Statistics and Programming, National Center for Injury Prevention and Control, CDC using WISQARS™.

Centers for Disease Control and Prevention
National Center for Injury Prevention and Control

CS230409